

APPENDIX D

ENVIRONMENTAL NOISE ASSESSMENT

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***LOWE'S HOME IMPROVEMENT STORE
SAN JOSE, CALIFORNIA
ENVIRONMENTAL NOISE ASSESSMENT***

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Introduction

This report presents the results of the environmental noise assessment conducted for the Lowe's Home Improvement Store located to the southeast of I-880 and Brokaw Road in San Jose, California. The project proposes the development of 199,486 sq. ft. of retail space, including a Lowe's Home Improvement Store. This report presents a discussion of the fundamentals of environmental acoustics, regulatory background information, and a discussion of noise levels measured at the site and at a similar facility in Sunnyvale, California. Noise impacts are assessed against the applicable State and Local guidelines, policies and regulations.

SETTING

Fundamentals of Environmental Noise

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Decibels and other technical terms are defined in Table 1.

Most of the sounds which we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a weighting that reflects the facts that human hearing is less sensitive at low frequencies and extreme high frequencies than in the frequency mid-range. This is called "A" weighting, and the decibel level so measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve. Typical A-weighted levels measured in the environment and in industry are shown in Table 2 for different types of noise.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources which create a relatively steady background noise in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_{01} , L_{10} , L_{50} , and L_{90} , are commonly used. They are the A-weighted noise levels equaled or exceeded during 1%, 10%, 50%, and 90% of a stated time period. A single number descriptor called the L_{eq} is also widely used. The L_{eq} is the average A-weighted noise level during a stated period of time.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, a descriptor, DNL (day/night average sound level), was developed. The DNL divides the 24-hour day into the daytime of 7:00 AM to 10:00 PM and the nighttime of 10:00 PM to 7:00 AM. The nighttime noise level is weighted 10 dB higher than the daytime noise level. The Community Noise Equivalent Level (CNEL) is another 24-hour average which includes both an evening and nighttime weighting.

Table 1: Definitions of Acoustical Terms Used in this Report

Term	Definitions
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max} , L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01} , L_{10} , L_{50} , L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Table 2: Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
	10 dBA	
	0 dBA	Threshold of human hearing

Regulatory Criteria

The State of California and the City of San Jose have established plans and policies designed to limit noise exposure at noise sensitive land uses. These plans and policies are contained in the following documents: (1) the State CEQA Guidelines, Appendix G, (2) the City of San Jose Noise Element of the General Plan, and (3) the City of San Jose Zoning Ordinance.

(1) California Environmental Quality Act (CEQA)

Under the California Environmental Quality Act (CEQA), noise impacts would be considered significant if the project would result in:

- a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- e) For a project located within an airport land use plan or where such a plan has not been adopted within two miles of a public airport or public use airport, if the project would expose people residing or working in the project area to excessive noise levels;
- f) For a project within the vicinity of a private airstrip, if the project would expose people residing or working in the project area to excessive noise levels.

Of these guidelines, items (a), (c), and (d) are applicable to the proposed project. There are no noise sensitive uses proposed for the project site. The project does not include any equipment that would generate substantial groundborne vibration at nearby uses and is not located in the vicinity of a public airport or private airstrip. Items (b), (e), and (f) are not carried forward in this analysis.

CEQA does not define what noise level increase would be considered substantial. Typically, a project generated increase of 3 dBA DNL or greater would be considered significant when projected noise levels would exceed those considered acceptable for the affected land use. An increase of 5 dBA DNL or greater would be considered a significant impact when projected noise levels would remain within those considered acceptable for the affected land use.

(2) City of San Jose General Plan

The Noise Element of the City of San Jose's 2020 Plan identifies noise and land use compatibility standards for various land uses. The City's goal is to, "...minimize the impact of noise on people through noise reduction and suppression techniques, and through appropriate land use policies." Policies presented in the Noise Element applicable to this project are as follows:

Policy 9. Construction operations should use available noise suppression devices and technology.

Policy 11. When located adjacent to existing or planned noise sensitive residential and public/quasi-public land uses, nonresidential land uses should mitigate noise generation to meet the 55 DNL guideline at the property line.

Policy 12. Noise studies should be required for land use proposals where known or suspected peak event noise sources occur which may impact adjacent existing or planned land uses.

(3) City of San Jose Zoning Ordinance

The City's Zoning Ordinance applies specific noise standards to Residential, Commercial and Industrial zoning districts which limit the sound pressure level generated by any use or combination of uses at any property line as shown in Table 3.

Table 3: City of San Jose Zoning Code Noise Standards

Land Use Types	Maximum Noise Level in Decibels at Property Line
Residential, open space, industrial or commercial uses adjacent to a property used or zoned for residential purposes	55
Open space, commercial, or industrial use adjacent to a property used or zoned for commercial purposes or other non-residential uses	60
Industrial use adjacent to a property used or zoned for industrial or use other than commercial or residential purposes	70

Existing Noise Environment

The project proposes the development of a Lowe's Home Improvement Warehouse and smaller retail shops on a currently undeveloped site east of Interstate 880 between Brokaw Road and Ridder Park Drive in northeastern San Jose, California. Interstate 880 borders the site to the west, Brokaw Road to the north, Coyote Creek to the northeast and east, and Ridder Park Drive to the south. The project site is surrounded primarily by industrial uses. A riparian corridor is located just east of the project site. The nearest existing noise sensitive receivers are residences located to the east and northeast, 1,800 feet and further from the project site. There is a residential development application on file with the City to develop the property east of Coyote Creek with residential and commercial uses, which could bring residences as close as 750 feet from the site. These potential residences would be well shielded from the project site by the intervening terrain, including the UPRR railroad line, which is elevated above the residences by about 8 feet, and the bridge over the creek, which is about 20 feet above the grade of the residences.

A noise monitoring survey was conducted at the site on August 29th to 30th, 2007, which included one long-term (24-hour) noise measurement at a representative location to the east of the site, along the riparian corridor (LT-1) and about 900 feet from the center of Interstate 880 (see Figure 1). Although this location was well shielded from I-880, the primary noise source continued to be freeway traffic noise, which generated a day-night noise level of 65 dBA DNL. Daytime hourly average noise levels ranged from 58 to 62 dBA L_{eq} and hourly average noise levels dropped to lows of 55 to 56 dBA L_{eq} between midnight and 4:00 am. The daily trend in noise levels at LT-1 is shown in Figure 2.

An additional long-term noise measurement (LT-2) was conducted at a Lowe's Store in Sunnyvale, California. The Sunnyvale Lowe's Store was open from 6:00 am to 10:00 pm during the 24-hour noise monitoring period. Based on review of the noise data, heavy-truck deliveries occurred during the 7:00 am and 12:00 noon hours. Noise measurement LT-2 was located about 100 feet from the center of the loading dock at the Lowe's Store in Sunnyvale, California. The primary noise sources at this location include truck and forklift movements, loading dock activities, and mechanical equipment. The day-night average noise level at the long-term location was 65 dBA DNL. Hourly average noise levels at a distance

of 100 feet from the loading dock were about 68 dBA during hours with heavy-duty truck deliveries and maximum noise levels typically ranged from 73 to 81 dBA. Hourly average noise levels ranged from 54 to 64 dBA during other store hours (between 6:00 am to 10:00 pm hours), with maximum noise levels typically ranging from 60 to 80 dBA. At night, when the store was closed, hourly average noise levels ranged from 45 to 61 dBA and maximum noise levels typically ranged from 50 to 80 dBA. Based on attended noise monitoring conducted at the Sunnyvale facility, maximum noise levels at distances of 50 feet from the noise source were about 51 to 53 dBA from idling forklifts, 60 to 65 dBA from backup alarms, 64 to 71 dBA from truck movements, 58 dBA from banging inside the truck, 67 from the trash compactor, and 57 dBA from the PA system. The daily trend in noise levels at LT-2 is shown in Figure 3.

Figure 1: Project Location Map and Noise Monitoring Location

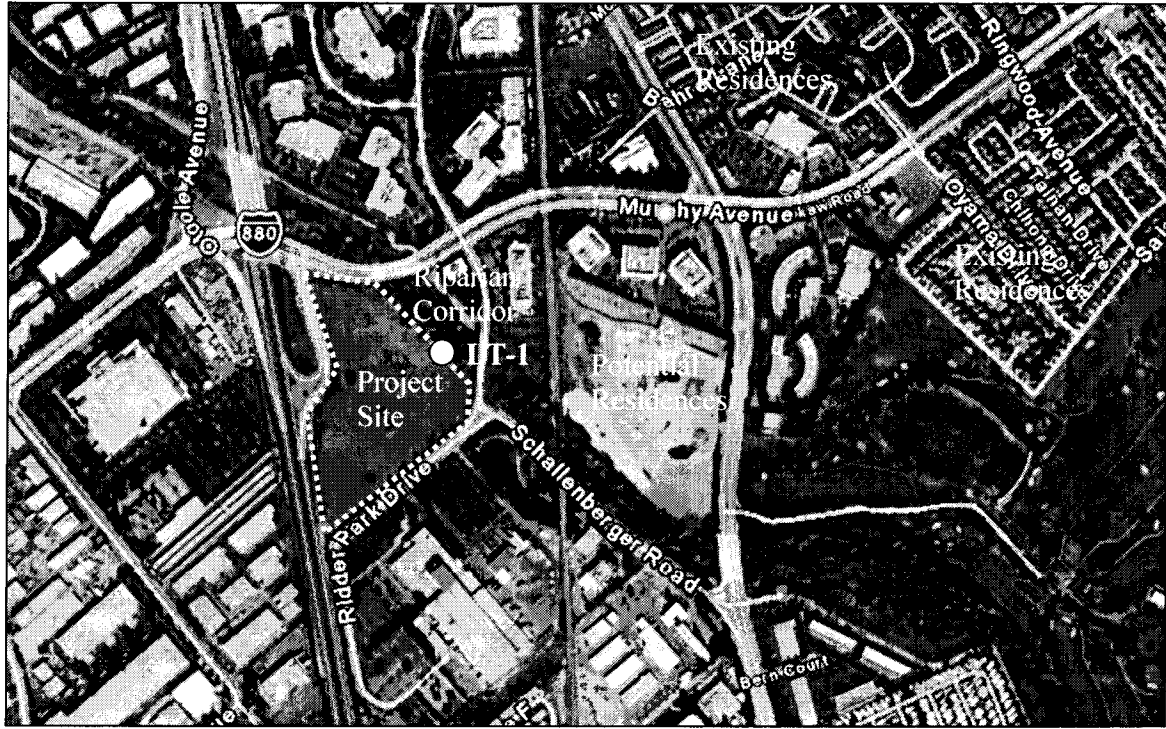


Figure 2: Daily Trend in Noise Levels at LT-1

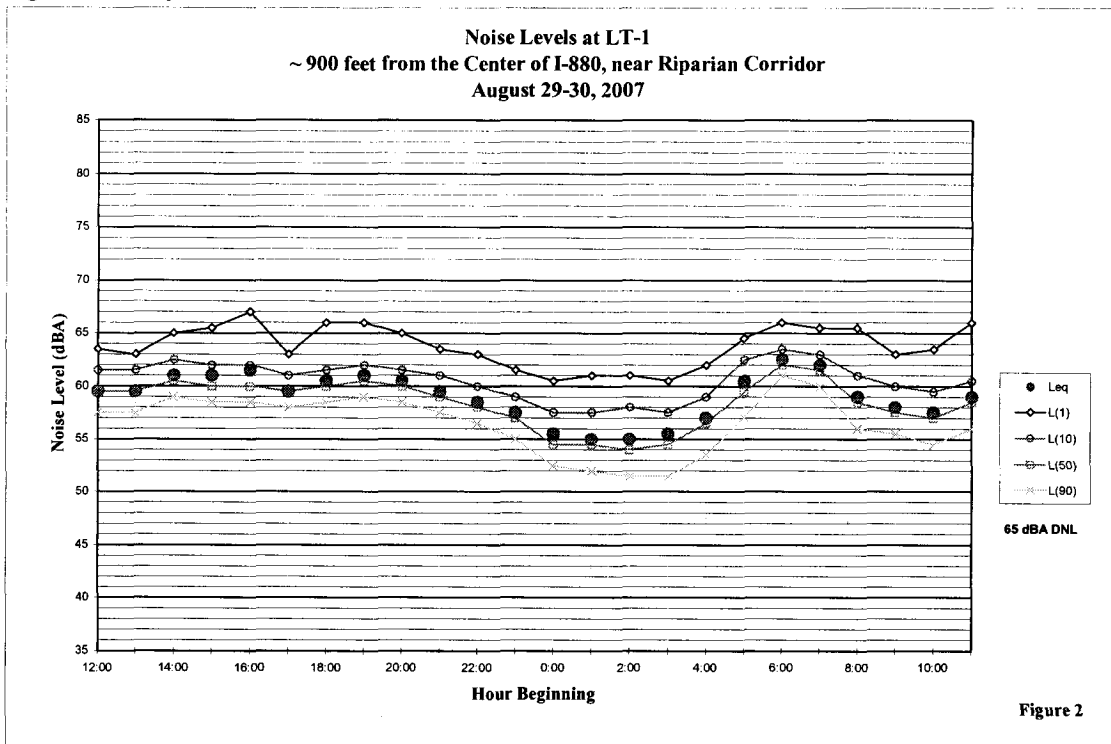
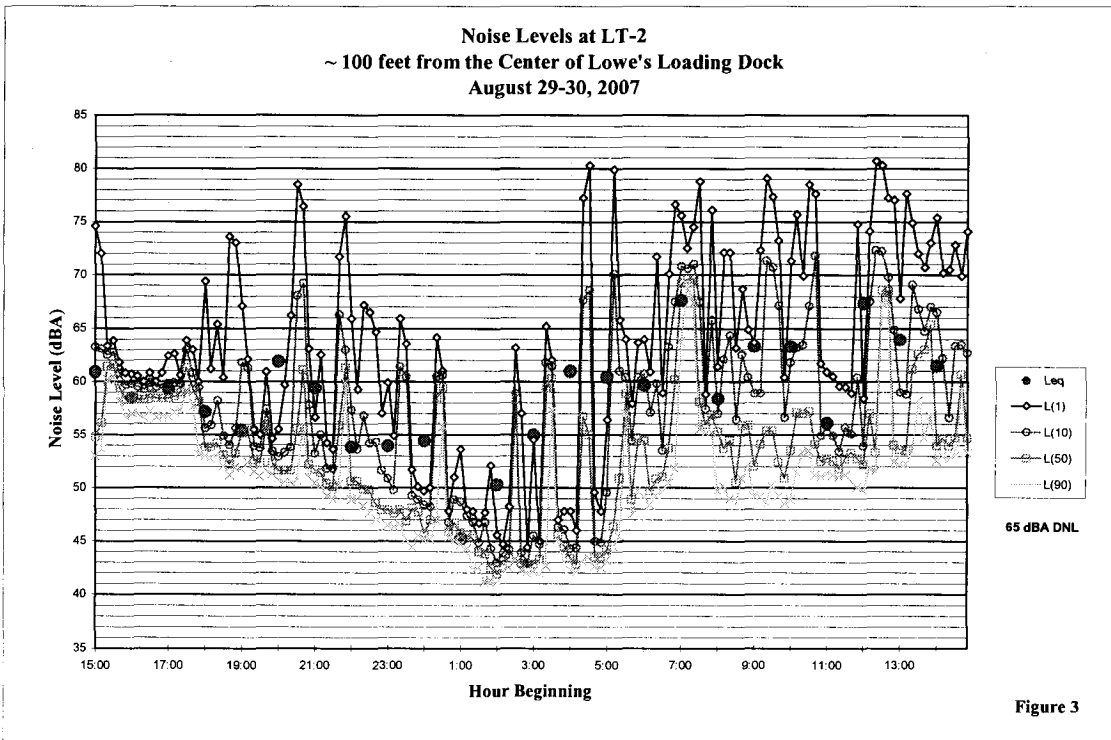


Figure 3: Daily Trend in Noise Levels at LT-2



NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

The following significance criteria is used in the analysis of project impacts:

1. **Project Operational Noise:** For non-transportation noise sources, including loading dock activities, delivery truck circulation, mechanical equipment, and parking lot noise, a significant impact would be identified if the onsite project-generated noise would exceed the existing ambient noise levels or 60 dBA L_{dn} at noise-sensitive land uses.
2. **Traffic Noise Increases:** A significant noise impact would occur if the project resulted in an increase of 3 dBA L_{dn} or greater at noise-sensitive land uses where existing or projected noise levels would exceed 60 dBA L_{dn} at noise sensitive receptors or an increase of 5 dBA L_{dn} or greater at noise-sensitive land uses where projected noise levels would continue to be 60 dBA L_{dn} or less at noise sensitive receptors.
3. **Construction Noise:** Due to the temporary nature of construction activities, construction noise levels are treated differently than operational noise levels. Significant noise impacts would result from construction if noise levels were sufficiently high enough to interfere with speech, sleep, or normal activities at nearby noise sensitive uses. Construction noise would be considered significant if hourly average noise levels were anticipated to exceed 60 dBA $L_{eq(hr)}$ and at least 5 dBA above the ambient at noise-sensitive land uses, and noise generating construction activities would occur for more than 12 months.

Impact 1: On-Site Project Operation Noise. On-site project activities are not anticipated to be audible at nearby noise sensitive receivers. **This is a less-than-significant impact.**

The primary noise sources associated with the operation of the project are anticipated to be parking lot activities, loading dock activities, truck circulation, and mechanical equipment.

Parking Lot Activities

The Lowe's Store would be open from 6:00 am to 10:00 pm on Monday to Saturday, and 7:00 am to 8:00 pm on Sunday. Approximately 751 parking stalls would be constructed with the development of the project. Noise associated with the use of the parking lot would include vehicular circulation, engines, car alarms, squealing tires, door slams, and human voices. The maximum sound (L_{max}) of a passing car at 15 mph typically ranges from 45 dBA to 55 dBA at distance of 100 feet. The noise generated during an engine start is similar. Door slams create lower noise levels. The hourly average noise level resulting from all of these noise-generating activities in a busy parking lot typically ranges from 40 dBA to 50 dBA L_{eq} at a distance of 100 feet from the parking area. Noise levels would decrease at a rate of 6 dB per doubling of distance. Intervening terrain and structures would further reduce these noise levels at nearby noise sensitive uses. At noise sensitive uses to the east and northeast, parking lot noise would primarily be shielded by the Lowe's Store. At the riparian corridor, average and maximum noise levels would be below noise levels generated by traffic along Interstate 880. At the potential residences located 750 feet east of the project site, average noise levels during a busy hour in the parking lot would be less than 30 dBA L_{eq} and maximum noise levels would be less than 35 dBA L_{max} . These noise levels would be well below ambient noise levels generated along local roadways and the railroad and would not typically be

audible. Parking lot noise would be even lower and likely inaudible at existing residences, located 1,800 feet and further from the site.

On-Site Delivery Truck Circulation and Loading Dock Activities

Truck deliveries would be anticipated for all of the retail commercial uses. Receiving hours for deliveries are between 7:00 am and 4:00 pm. Goods would typically be delivered to small retail shops by medium sized trucks. The Lowe's Store is anticipated to have 1 to 2 heavy-duty truck deliveries per day, with 15 to 20 medium duty trucks. Based on review of the site plan, the majority of truck circulation would take place along the eastern perimeter of the site, adjacent to the Lowe's Store and near the riparian corridor.

Noise levels generated during delivery truck circulation are dependent on the speed and type of trucks, but typical maximum (L_{max}) noise levels generated by slow moving heavy duty trucks range from 70 to 75 dBA at a distance of 50 feet. Slow moving medium duty trucks typically generate L_{max} noise levels of about 60 to 65 dBA at 50 feet. Maximum noise levels generated by heavy trucks pulling into and out of loading docks typically reach 75 dBA at a distance of 50 feet. Idling trucks typically generate noise levels of about 68 dBA L_{eq} at a distance of 50 feet. Backup beepers vary depending on the truck and directivity of the sound, but maximum noise levels are typically in the range of 65 to 75 dBA L_{max} at a distance of 50 feet. Noise generated by loading dock activities and slow moving trucks would drop off at a rate of about 6 dB per doubling of distance.

Based on noise measurements conducted at the Sunnyvale store, hourly average noise levels at a distance of 100 feet from the loading dock were about 68 dBA during hours with heavy-duty truck deliveries (7:00 am and 12:00 pm hours), with maximum noise levels typically ranging from 73 to 81 dBA. Hourly average noise levels ranged from 54 to 64 dBA during other store hours (6:00 am to 10:00 pm hours), with maximum noise levels typically ranging from 60 to 80 dBA. At night, when the store was closed, hourly average noise levels ranged from 45 to 61 dBA and maximum noise levels typically ranged from 50 to 80 dBA. Noise levels in unshielded portions of the riparian corridor adjacent to the loading dock would experience similar noise levels. Noise levels at the potential residences to the east of the railroad would be 20 to 25 dBA lower, below ambient traffic and railroad noise levels, and would not typically be distinguishable at the proposed homes. Loading dock noise would be even lower and likely inaudible at existing residences, located 1,800 feet and further from the site.

Mechanical Equipment

It is anticipated that most of the retail uses would be fully air-conditioned and that there would be heating, ventilating, and air conditioning units that could be located in unshielded areas. Noise generated by mechanical equipment would vary significantly depending on the type of equipment and the size. The most significant mechanical equipment would likely be associated with the Lowe's Store, which is located adjacent to the riparian corridor, on the eastern portion of the site. Noise impacts would depend on system design level specifications including the equipment location, type, size, capacity, and enclosure design. These details are typically not available until later phases of the project design and development review process.

Based on measurements conducted at the Sunnyvale Lowe's Store, rooftop equipment would not be audible at adjacent uses. Trash compactors, which could be located on the northwestern or northeastern portion of the store, are anticipated to generate average noise levels of about 60 dBA at an unshielded distance of 100 feet, with maximum noise levels ranging from 50 to 70 dBA. The trash compactors would only be used during store hours. Due to the increase in distance and the acoustical shielding provided by intervening terrain, noise levels generated by on-site mechanical equipment at the potential residences would be 20 to 25 dBA lower. Resulting mechanical equipment noise levels would be less than 40 dBA L_{eq} at the potential residences when the compactor is in use, which would be below ambient

traffic and train noise levels. Noise levels generated by smaller retail mechanical equipment would be much lower.

The project also proposes a standby power generator, which would be enclosed by a 12-foot high concrete wall. The generator would be used only in the event of power outages and would be tested once per week for about one hour, during the day. The emergency generator has not been selected at this time. Based on emergency generators at similar facilities, it is estimated that a unit of this type would generate a noise level of about 85 dBA at a distance of 3 feet from the unit. At the riparian corridor, 100 feet from the unit and shielded by the 12-foot high wall, the noise level is estimated to be about 55 dBA. Noise levels at the potential residences would be 20 to 25 dBA lower and would not be audible above ambient noise levels.

Overall Noise Impacts

At the proposed residences to the east, Lowe's activities would not typically be distinguishable above ambient noise sources such as traffic and trains. Due to the character of the loading dock sounds (backup alarms, etc), maximum noise levels could occasionally be audible. The project would not measurably increase hourly or day-night average noise levels in this area. Noise impacts to existing residences, which are located further from the site, would be even lower. This is a less than significant impact.

At the riparian corridor, located adjacent to the Lowe's Store, noise levels could increase by up to 3 dBA DNL in locations that have full exposure to the loading dock area, but are still exposed to I-880 traffic. In portions of the riparian corridor which would be shielded from the interstate by the Lowe's Store and are not located directly adjacent to the loading docks, noise levels could decrease somewhat. There are no guidelines to assess noise impacts on wildlife.

Mitigation 2: None Recommended.

Impact 3: Off-Site Traffic Noise Increases. Project traffic would not measurably increase traffic noise levels at noise sensitive receptors in the vicinity of the site. **This is a less than significant impact.**

Based on the traffic study by Hexagon Transportation Consultants, the project would generate about 10,859 average daily trips, which would be spread along the major roadways in the vicinity of the project, including Interstate 880, Highway 101, Montague Expressway, Hostetter Road, and Zanker Road. Existing traffic volumes along these roadways are high and project traffic is not calculated to measurably increase noise levels at noise sensitive uses in the vicinity of the project. This is a less than significant impact.

Mitigation 2: None Recommended.

Impact 3: Construction Noise. Noise-generating activities associated with the construction of the project would not typically be distinguishable from the ambient noise environment at nearby noise sensitive receptors. **The impact would be considered less-than-significant.**

The project would be constructed in two phases over a period of less than one year, with the Lowe's Store constructed during the first phase and the additional retail uses constructed during the second phase. The primary on-site noise sources associated with the project are anticipated to be parking lot activities, delivery truck circulation and loading dock activities, and mechanical equipment noise. Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, and the distance between construction noise sources

and noise sensitive areas. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise sensitive land uses, or when construction lasts over extended periods of time.

Noise generated by construction would be the greatest during site grading activities and excavation for underground utilities. Pile driving will not be employed as a construction method. Typical maximum noise levels from excavation and grading activities are anticipated to range from 70 to 90 dBA at the nearest residence at a distance of 50 feet from the source. The typical range of maximum noise levels at 50 feet during active construction of retail buildings would be about 65 to 85 dBA. Typical hourly average construction generated noise levels are about 75 dBA to 85 dBA measured at a distance of 50 feet from the center of the site during busy construction periods. Construction generated noise levels drop off at a rate of about 6 dBA per doubling of distance between the source and receptor. Shielding by buildings or terrain often result in much lower construction noise levels at distant receptors.

The potential residences may or may not be constructed prior to the Lowe's Store. At the nearest existing residences, located about 1,800 feet to the northeast, hourly average construction generated noise levels would be less than 55 dBA during busy construction periods, not taking into account any shielding by buildings or terrain. Construction noise levels would not be distinguishable from noise levels generated by ambient noise sources. Construction noise would be even lower at noise sensitive receivers located further from the project site. Although the project site is about 500 feet from the nearest noise sensitive receptor and is not anticipated to generate excessive noise levels at noise sensitive receptors in the vicinity of the site, the following standard construction practices are recommended to further reduce construction noise impacts:

- Construction activities shall be limited to the hours between 7:00 a.m. to 7:00 p.m., Monday through Friday, and between the hours of 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities should occur on Sundays or holidays.
- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Utilize "quiet" air compressors and other stationery noise sources where technology exists.
- Designate a "disturbance coordinator" who would be responsible for responding to any complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., bad muffler, etc.) and will require that reasonable measures be implemented to correct the problem.

Mitigation 3: None Recommended.